

# **Update on Washington's Bike and Walk Data Network: How Permanent Counters & Annual Counts Work Together**



**Washington State  
Department of Transportation**



**cascade**  
BICYCLE CLUB

# Presenters :

**Kelli Refer**  
Statewide Engagement Director,  
Cascade Bicycle Club

**Ed Spilker**  
Active Transportation, WSDOT

**Julie Jackson**  
GIS Mapping, Training and Support, WSDOT

**Kim Brown, ADA/ Transportation Options Coordinator for the City of Bellingham**

**Amanda Mansfield,**  
Associate Transportation Planner for  
Spokane Regional Transportation Council





# Why does ped/ bike data matter?

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- Provide Data for Transportation Plans and Comprehensive Plans
- Strengthens Funding Requests
- Builds Support for Policies like Complete Streets and Vision Zero



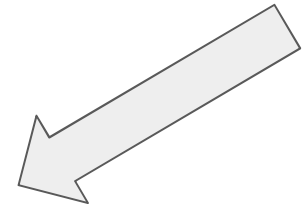
# Cascade policy strategies



Building bicycle networks in cities & towns



**Making bikes count**



Connecting regional trail networks



Keeping people safe & preventing injury



Training advocates across the state



State & federal relations for better bicycling



Passing bike-friendly ballot measures

# What is next?



- [Use the WSDOT Bike/ Ped Portal](#)
- Save the date for the annual bike/ ped counts on September 26-28th

# **Update on WSDOT's Bicycle and Pedestrian Count Program**

Ed Spilker, State Bicycle and Pedestrian Coordinator  
WSDOT Active Transportation Division  
June 22, 2017

# Counting Bicyclists and Pedestrians: Expansion and Evolution of WSDOT's Count Program

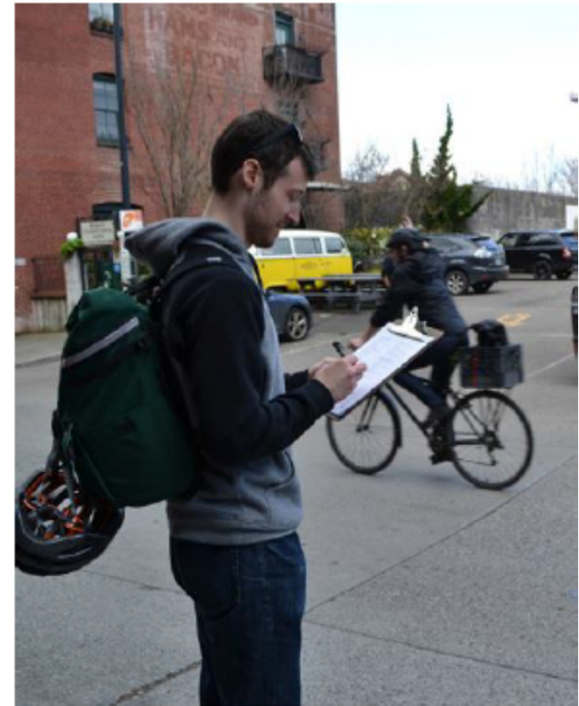
- Manual Counts
- Permanent Counter Network
- Volume Metrics
- Count Guidebook (Sept 2017)
- Reporting Requirements
- Data Sharing Opportunities
- Bicycle and Pedestrian Count Data Portal



# Manual Counts

## WSDOT's Bicycle and Pedestrian Documentation Project

- Conducted annually since 2008, and now includes nearly 400 sites in over 50 communities across the state.
- In partnership with Cascade Bicycle Club, local, and regional agencies.
- Consistent with the National Bicycle and Pedestrian Documentation Project  
<http://bikepeddocumentation.org/>.



# Permanent Counter Network

## Permanent-Continuous Bicycle and Pedestrian Counter Installations and Data Collection

WSDOT continues to install permanent bicycle & pedestrian counters at locations across the state to better understand changes in bicycle and pedestrian volumes.

- Pilot Program
- 2015-17 Pedestrian and Bicycle Program Project: 50 permanent counters
- 2017-19 Pilot Communities Program: 21 additional permanent counters
- Portable bicycle and pedestrian counters

# Bicycle and Pedestrian Count Data Uses

## Estimate Volumes on the Network

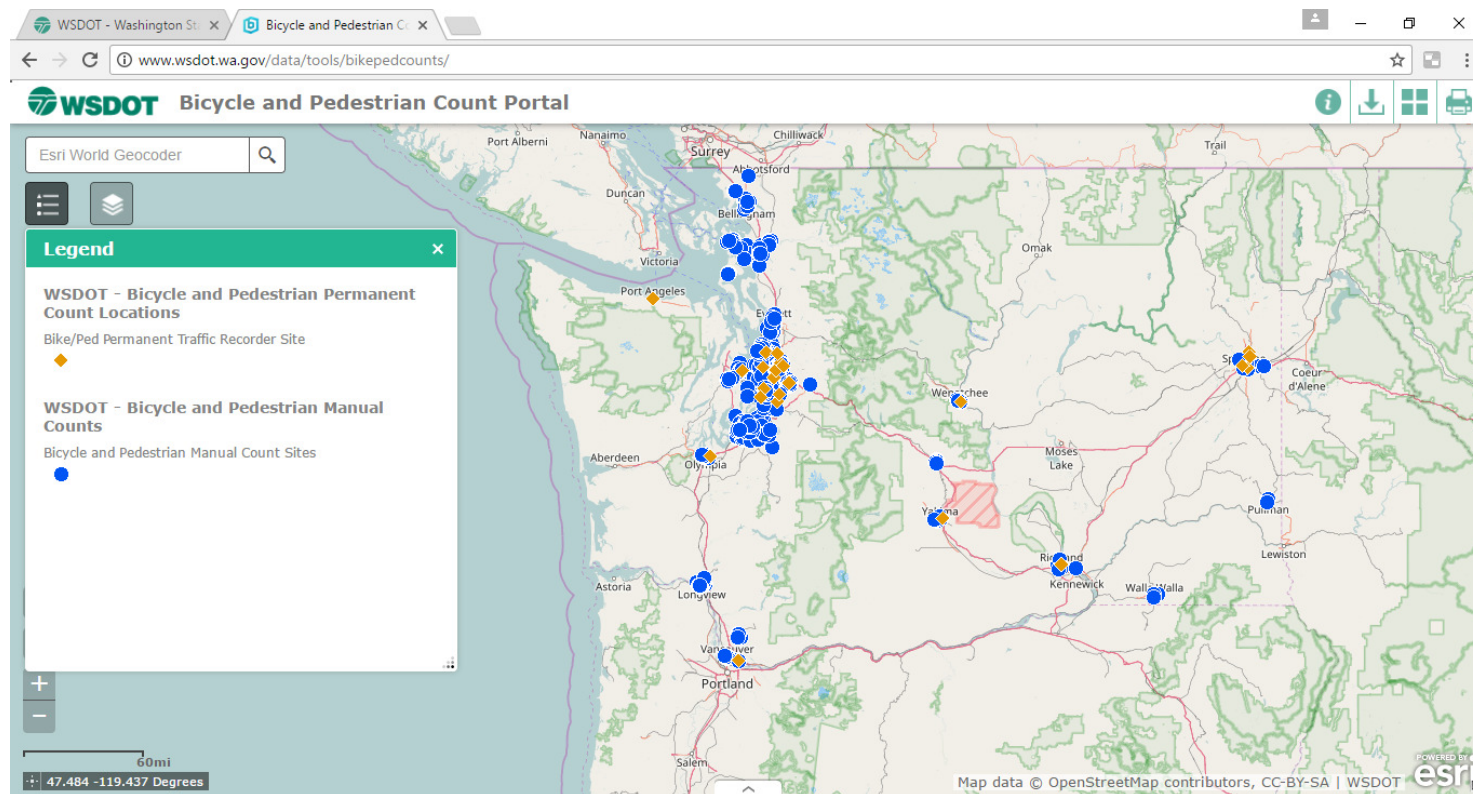
- Facility Level
- Can be Aggregated to City, Region, and State Levels

## Other Uses

- Safety Analysis/ Exposure Rates
- Regional Model Validations
- Project Prioritization/ Evaluations
- Planning and Design
- Trend Analysis/ Performance Reporting
- Economic Impact Studies
- Public Health Assessments
- Signal Timing

# WSDOT's Bicycle and Pedestrian Data Portal

- WSDOT maintains an interactive web map of manual and permanent count locations statewide.
- <http://www.wsdot.wa.gov/data/tools/bikepedcounts/>



# Bicycle and Pedestrian Volume Metrics

## Annual Average Daily Non-motorized Traffic (AADNT)

- **AADBT** for bicycle traffic
- **AADPT** for pedestrian traffic

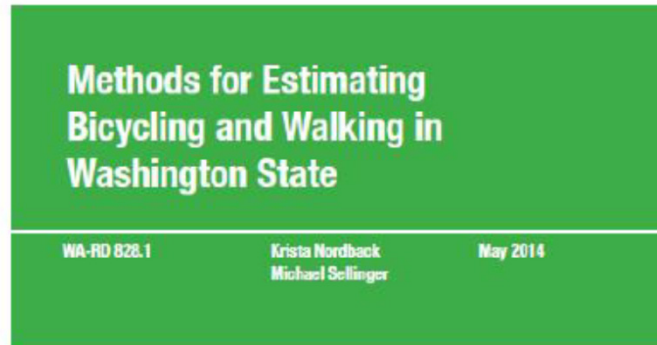
## Bicycle Miles Traveled (BMT) and Pedestrian Miles Traveled (PMT)

WSDOT Research:

<https://www.wsdot.wa.gov/research/reports/fullreports/828.1.pdf>

NITC Research:

[http://pdxscholar.library.pdx.edu/trec\\_report\\_s/128/](http://pdxscholar.library.pdx.edu/trec_report_s/128/)



Washington State  
Department of Transportation  
Office of Research & Library Services

WSDOT

NITC  
NATIONAL INSTITUTE for  
TRANSPORTATION and COMMUNITIES

FINAL REPORT

Estimating Walking and Bicycling at the  
State Level

NITC-RR-708 March 2017

NITC is a U.S. Department of Transportation  
national university transportation center.

TREC  
Transportation Research Center

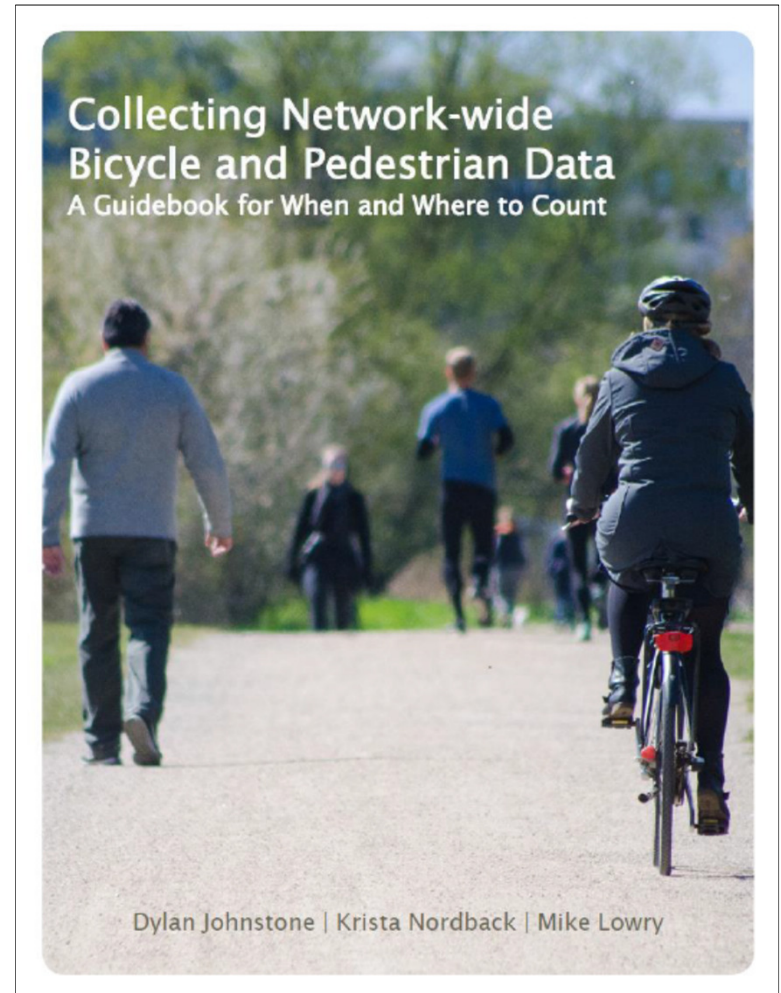
# Collecting Network-wide Bicycle and Pedestrian Data

## Guidebook for When and Where to Count

Available in September 2017

### Researchers

- **Krista Nordback, PhD, PE**, University of North Carolina–Highway Safety Research Center
- **Mike Lowry, PhD, PE**, University of Idaho
- **Dylan Johnstone**, Portland State University–Transportation Research and Education Center



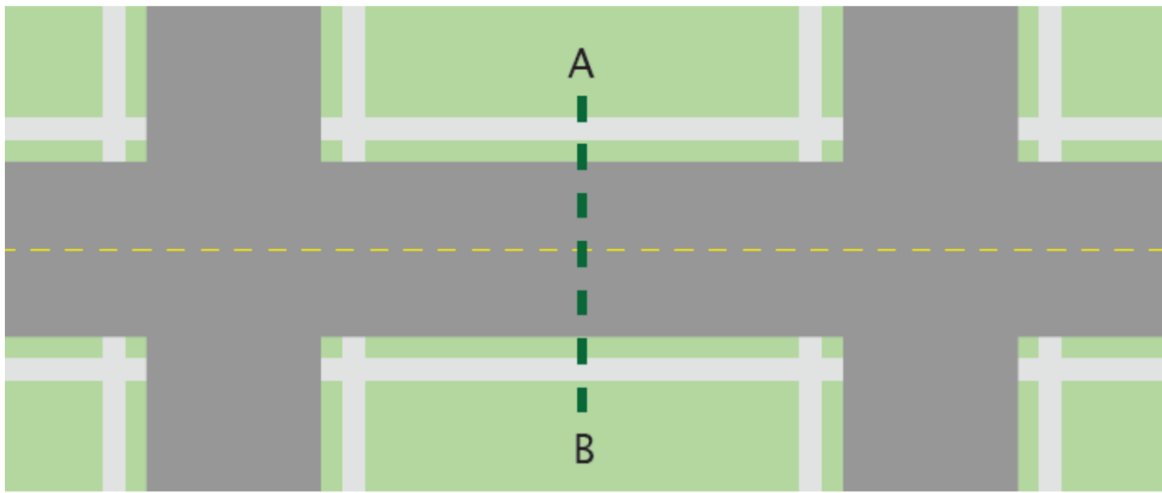
# Types of Count Data

Network-wide count programs, such as Washington State's Bicycle and Pedestrian Count Program require:

- **Permanent Continuous**
- **Short Duration Recurring (Manual Counts)**
- Short Duration Special Purpose
  - Before/After Project Evaluations
  - Safety Studies

# Recommended Manual Counting Methods

- Screenline Counts
- 10 locations per year per 100 centerline miles of roadway
- Select sites randomly



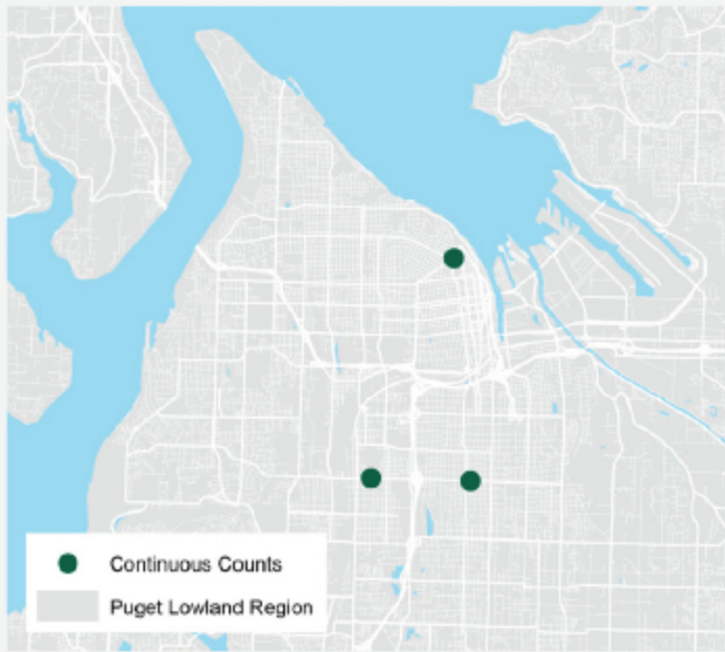
# Recommended Manual Counting Methods

## When to Count

Time of day	7-9am	11am-1pm	5-7pm	12-2pm
	AM Peak	Off-Peak Noon Activity	PM Peak	Weekend
Day of week	Weekday (Choose one T,W,Th)			Saturday
Months	Counts may be taken in May, July, or September			

# Overview of How Network-Wide Count Programs Work

## Step 1: Data Collection



Automatic counters collect continuous data

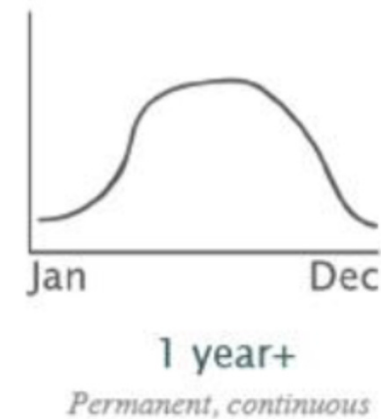


Volunteers collect manual count data

# Overview of How Network-Wide Count Programs Work

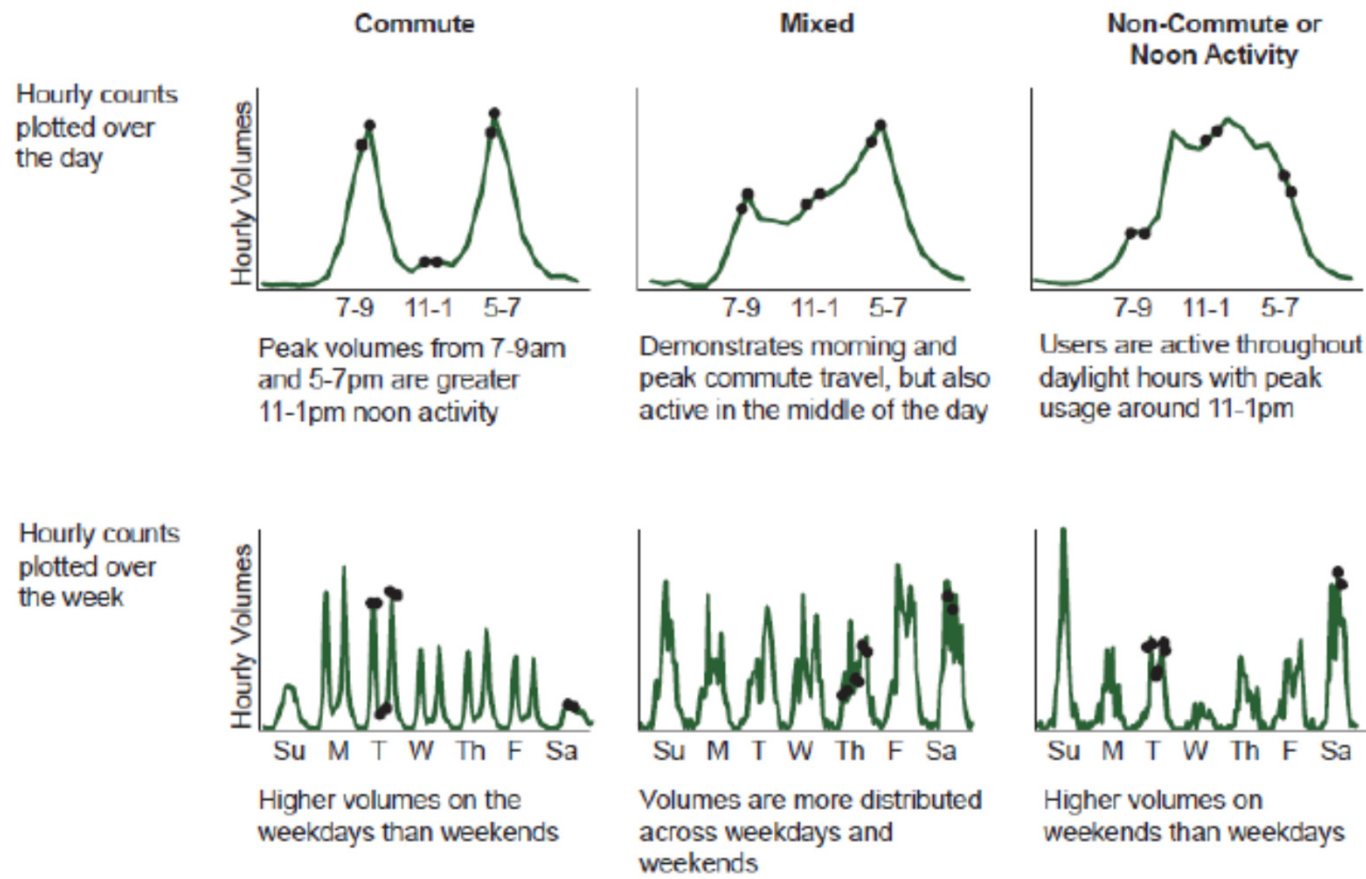
## Step 2: Create Adjustment Factors

**Factor groups** have corresponding adjustment factors that are calculated using **continuous data** from communities within the same region.



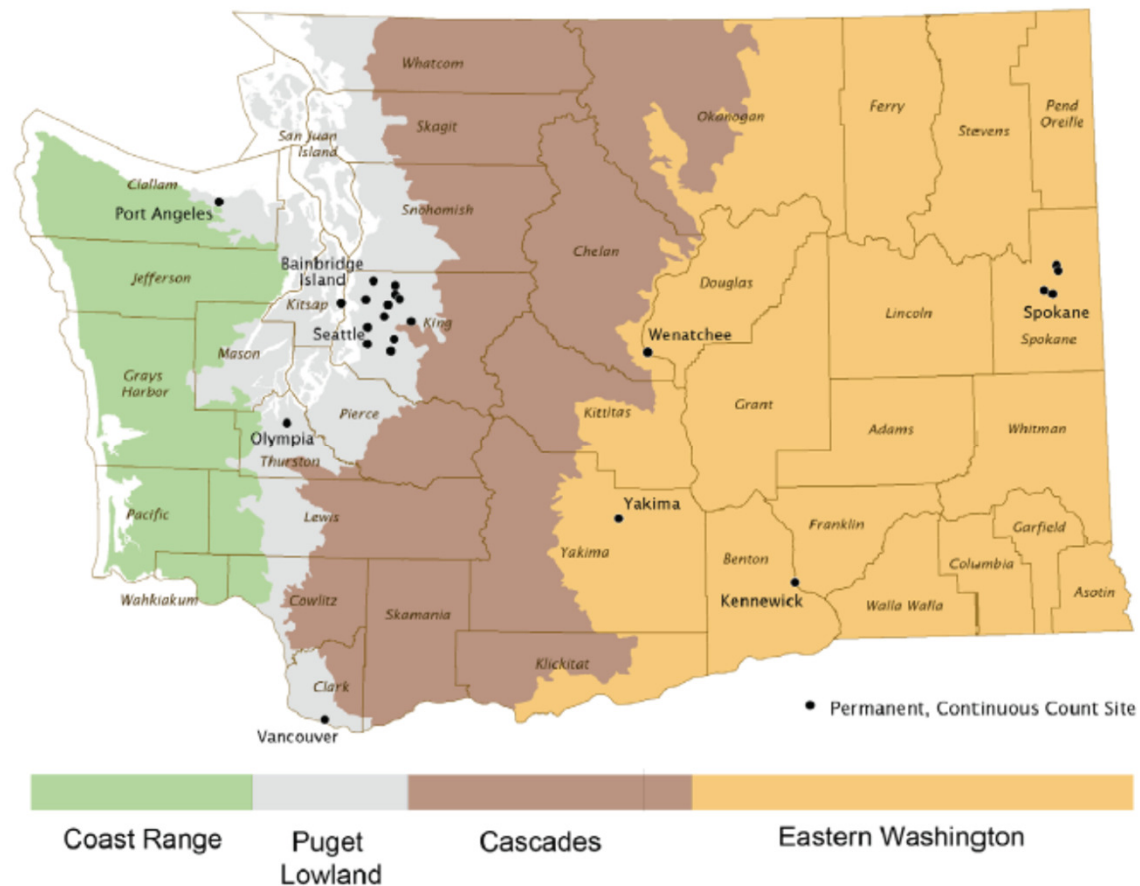
# Collecting Network-wide Bicycle and Pedestrian Data

## Determine Factor Groups: Travel Patterns



# Collecting Network-wide Bicycle and Pedestrian Data

## Determine Factor Groups: Climatic Zones

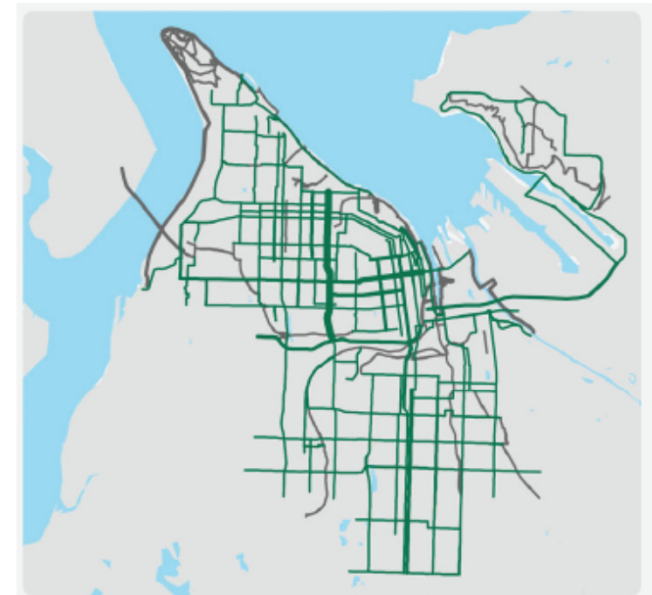


# Overview of How Network-Wide Count Programs Work

## Step 3: Apply Adjustment Factors

Estimated AADNT = Manual count data / Adjustment factor

Date	Time	Adjustment Factor	Manual Counts	Est-AADB
Sept. 28	AM	0.11	316	2,900
	PM	0.10	335	3,300
Average Estimated AADB				3,100



Adjustment factors are applied to manual count data to estimate AADNT

# Reporting Standards for Bicycle and Pedestrian Data

## FHWA Standards

- Traffic Monitoring and Analysis System (TMAS)
  - 2016 Traffic Monitoring Guide Sections 7.9 and 7.10: [Coding Nonmotorized Station Location Information in the 2016 Traffic Monitoring Guide Format](#)
- Report data in 1 hour bins
- AADNT, AADBT, AADPT

# Bicycle and Pedestrian Data Sharing

## Additional Count Sites:

- Permanent Counters in Operation
- Additional Manual Counts
- Requests For New Installations

**Ed Spilker**

[SpilkeE@WSDOT.WA.GOV](mailto:SpilkeE@WSDOT.WA.GOV)

360-705-7387

# WSDOT Region Bicycle and Pedestrian Coordinators

**Jerry Compton**

Eastern Region

[COMPTON@wsdot.wa.gov](mailto:COMPTON@wsdot.wa.gov)

509-324-6196

**Cynthia McGlothern**

North Central Region

[MCGLOTC@wsdot.wa.gov](mailto:MCGLOTC@wsdot.wa.gov)

509-667-2910

**Thomas Noyes**

Northwest Region—Planning

[NOYEST@wsdot.wa.gov](mailto:NOYEST@wsdot.wa.gov)

206-464-1272

**Barb Briggs**

Northwest Region—Traffic

[BRIGGBA@wsdot.wa.gov](mailto:BRIGGBA@wsdot.wa.gov)

206-440-4486

**Elizabeth Sjostrom**

Northwest Region—Mt Baker Area

[SJOSTRE@wsdot.wa.gov](mailto:SJOSTRE@wsdot.wa.gov)

360-757-5984

**TJ Nedrow**

Olympic Region

[NEDROWT@wsdot.wa.gov](mailto:NEDROWT@wsdot.wa.gov)

360-357-2728

**Paul Gonseth**

South Central Region

[GONSETP@wsdot.wa.gov](mailto:GONSETP@wsdot.wa.gov)

509-577-1630

**Ken Burgstahler**

Southwest Region

[BURGSTK@wsdot.wa.gov](mailto:BURGSTK@wsdot.wa.gov)

360-905-2052

# WSDOT Active Transportation Contacts

## **Barb Chamberlain**

Active Transportation Division Director  
ChambBa@WSDOT.WA.GOV  
206-716-1130

## **Charlotte Claybrooke**

Active Transportation Program Manager  
ClaybrC@WSDOT.WA.GOV  
360-705-7302

## **Ed Spilker**

State Bicycle and Pedestrian Coordinator  
SpilkeE@WSDOT.WA.GOV  
360-705-7387





# Bicycle Count Program

June 22, 2017



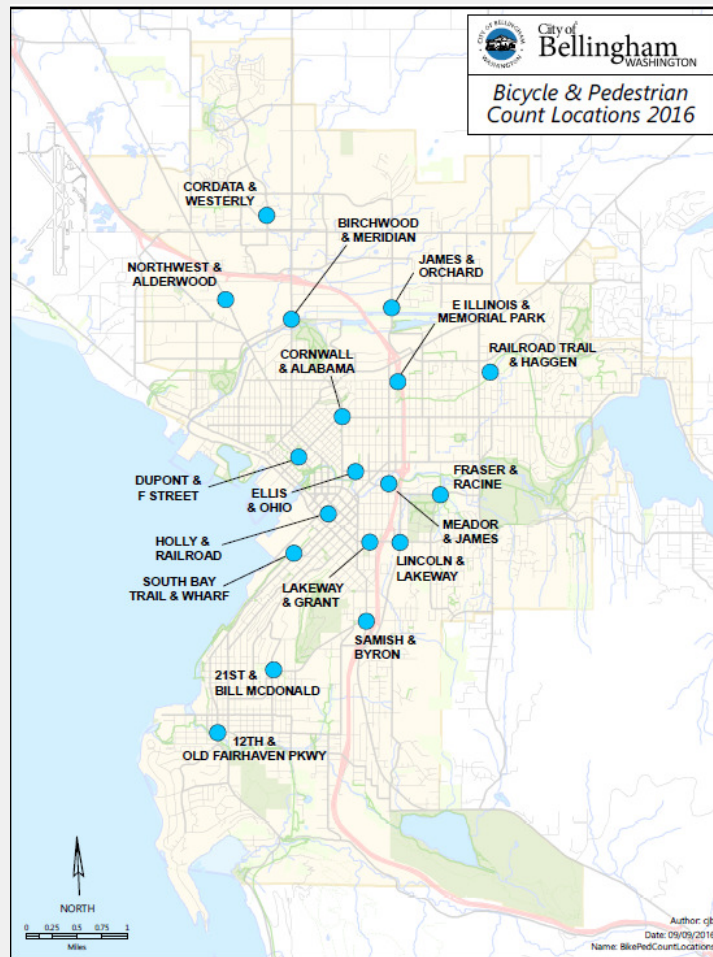
City of  
**Bellingham** Public Works

# Manual Counts

- Started in 2008 with 6 count sites
- Since 2012, 18 count sites
- ~ 50 volunteers



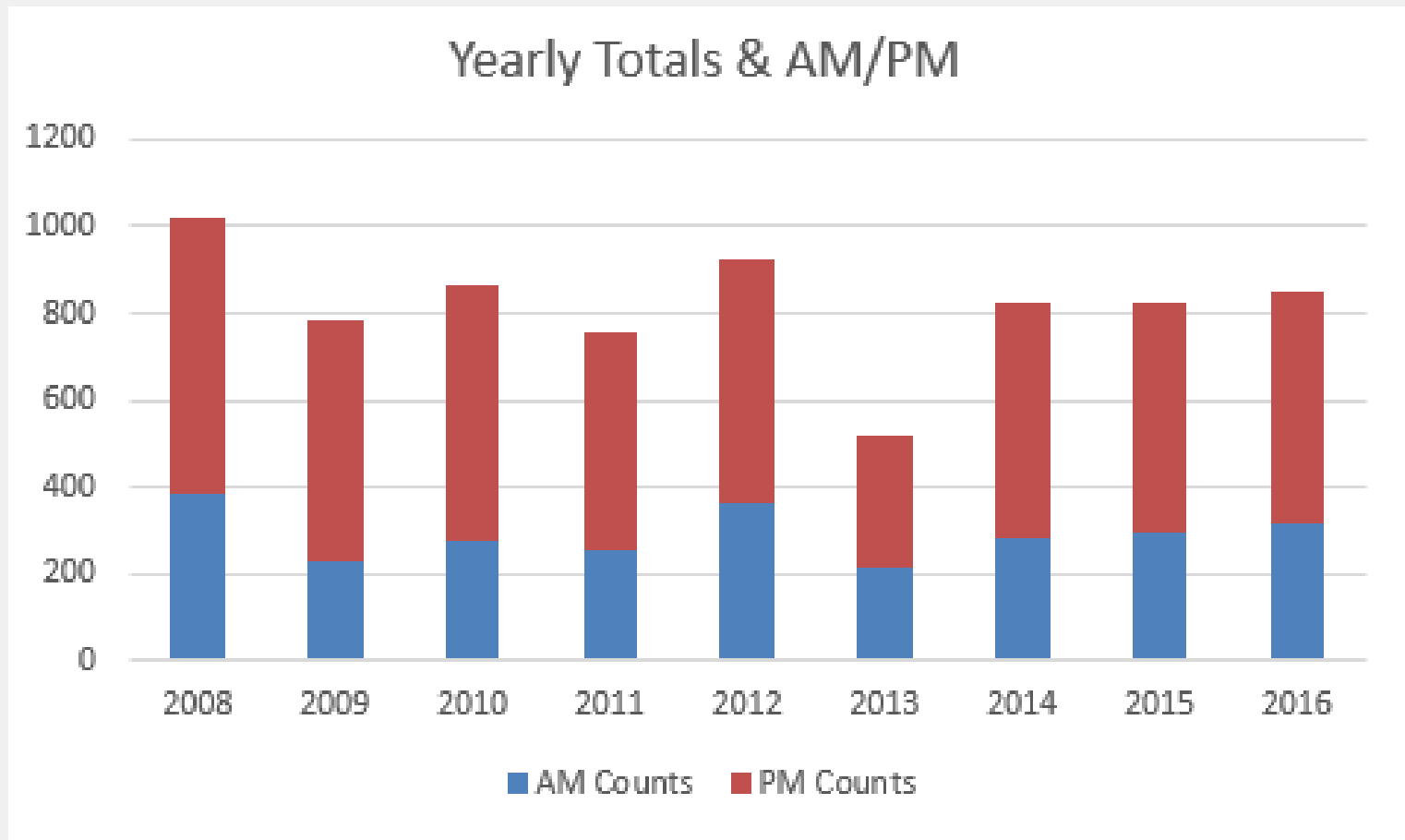
# Count Locations



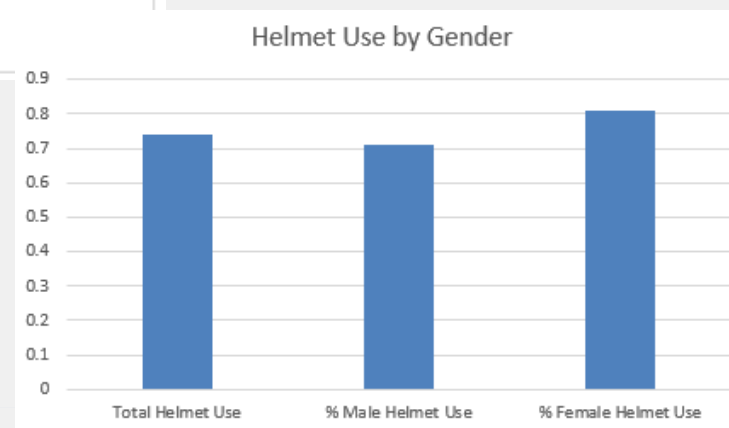
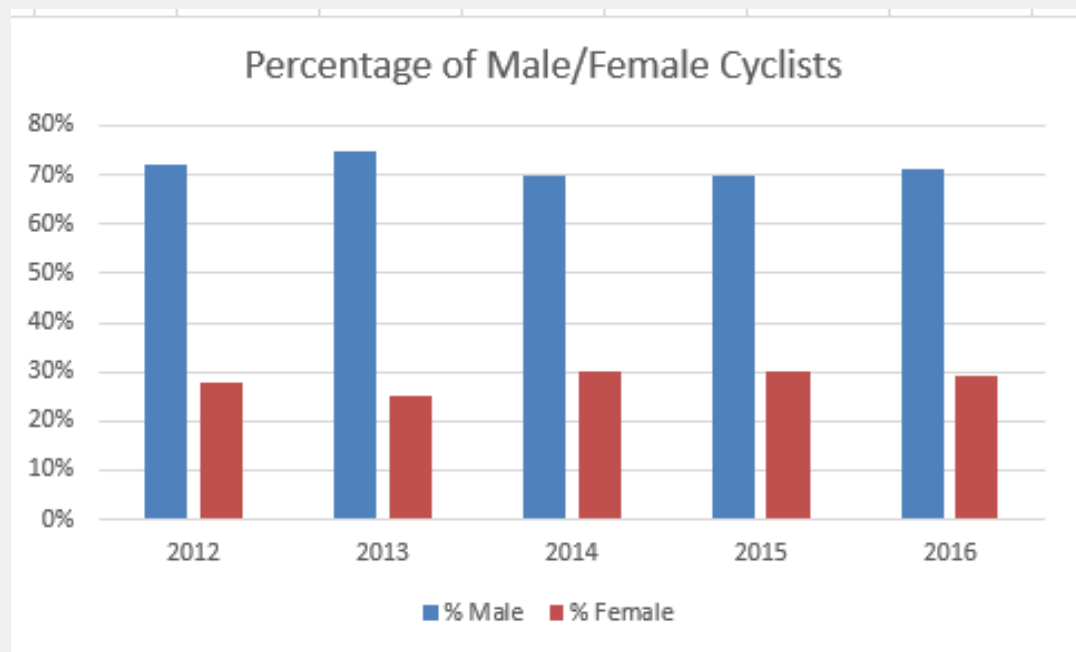
# Count Data

Location	Time	Weather										Bike	Bike	Bike	Bike	Bike	Bike	Bike	Bike	Bike	Ped	Ped	Ped	Ped	Ped	Ped	Ped	Ped
2008 locations		2008	2009	2010	2011	2012	2013	2014	2015	2016	2008#	2009#	2010#	2011#	2012#	2013#	2014#	2015#	2016#	2008#	2009 #	2010#	2011#	2012#	2013#	2014#	2015#	
Northwest Ave/Alderwood Ave	am	3	2	3	3	2	2	3	3	3	66	30	40	36	44	38	42	49	57	44	25	20	22	48	52	41	41	
Northwest Ave/Alderwood Ave	pm	3	3	3	3	3	3	3	3	3	63	37	52	46	67	53	51	61	67	30	23	16	37	74	53	59	79	
Cornwall Ave/Alabama St	am	2	2	3	2	3	2	3	3	3	70	62	44	51	70	51	69	66	60	40	37	41	45	58	55	66	43	
Cornwall Ave/Alabama St	pm	2	2	3	3	3	2	3	3	3	67	70	52	47	70	44	77	64	70	38	77	32	67	52	44	58	60	
Holly St/Railroad Ave	am	3	2	3	3	2	3	3	3	3	129	81	102	95	140	63	90	89	91	226	191	310	186	247	255	202	189	
Holly St/Railroad Ave	pm	3	2	3	3	3	2	3	3	3	272	243	270	224	214	119	236	181	207	731	603	644	729	1011	783	788	836	
South Bay Trail/Wharf St	am	2	2	3	3	3	2	3	3	3	38	27	40	38	40	27	41	34	52	38	39	36	58	43	30	43	69	
South Bay Trail/Wharf St	pm	3	2	3	3	3	3	3	3	3	152	140	124	121	137	29	102	133	100	122	115	149	131	133	50	107	125	
Fraser St/Racine St	am	2	2	3	2	3	2	3	3	3	34	14	23	18	40	12	14	25	29	11	17	41	20	59	63	38	30	
Fraser St/Racine St	pm	2	2	3	3	3	2	3	3	3	38	22	41	34	28	12	34	37	37	61	29	58	51	39	38	58	53	
Railroad Trail/Barkley Village	am	3	2	3	3	2	3	3	3	3	49	15	25	17	27	23	24	32	27	69	46	52	89	139	60	60	83	
Railroad Trail/Barkley Village	pm	2	2	3	3	3	3	3	3	3	39	41	51	32	49	45	41	55	54	155	123	171	156	153	122	112	204	
Totals:		30	25	36	34	33	29	36	36		1017	782	864	759	926	516	821	826	851	1565	1325	1570	1591	2056	1605	1632	1812	
*In 2013, roundabout under construction at S. Bay/Wharf																												
New Locations in 2009	Time	Weather											Bike	Bike	Bike	Bike	Bike	Bike	Bike	Bike		Ped	Ped	Ped	Ped	Ped	Ped	Ped
			2009	2010	2011	2012	2013	2014	2015	2016		2009 #	2010#	2011#	2012#	2013#	2014#	2015#	2016#		2009#	2010#	2011#	2012#	2013#	2014#	2015#	
Lakeway at Grant	am		2	3	3	3	3	3	3	3		38	34	45	34	33	43	38	36		37	33	43	45	66	45	56	
Lakeway at Grant	pm		2	3	3	3	3	2	3	3	1	50	65	39	75	48	60	45	41		55	132	160	157	159	143	137	
Cordata at Westerly	am		2	3	2	3	2	3	3	3		17	18	17	26	24	12	24	14		49	58	60	65	58	108	102	
Cordata at Westerly	pm		2	3	3	3	2	3	3	3		14	13	26	35	26	27	22	25		81	156	115	147	156	177	180	
E. Illinois at Memorial Park	am		2	3	3	3	2	3	3	3		31	26	39	32	25	29	15	45		28	11	29	48	109	48	58	
E. Illinois at Memorial Park	pm		2	2	3	3	2	3	3	3		28	37	47	62	29	47	47	38		27	19	29	23	13	18	29	
Dupont at 'F'	am		2	3	3	2	2	3	3	3		73	83	89	106	54	109	117	106		43	42	48	49	19	41	70	
Dupont at 'F'	pm		2	3	3	3	2	3	3	3		62	82	147	140	78	138	136	135		55	62	52	64	64	94	63	
21st at Bill McDonald Pkwy	am		2	3	2	3	3	3	3	3		80	88	68	96	59	73	77	66		393	462	394	485	399	438	504	
21st at Bill McDonald Pkwy	pm		2	3	3	3	2	3	3	3		72	121	102	110	81	87	90	68		373	516	422	528	450	452	450	
Totals:			20	29	28	29	22	30	30			465	567	619	716	457	625	611	574		1141	1491	1352	1611	1493	1564	1649	
New Locations in 2010	Time	Weather											Bike	Bike	Bike	Bike	Bike	Bike	Bike			Ped	Ped	Ped	Ped	Ped	Ped	
				2010	2011	2012	2013	2014	2015	2016		2010#	2011#	2012#	2013#	2014#	2015#	2016#			2010#	2011#	2012#	2013#	2014#	2015#		
James at E. Orchard	am			3	3	3	3		3	3		9	12	15	6		3	7			5	7	2	1		4		
James at E. Orchard	pm			3	3	3	2		3	3		20	12	14	4		16	30			8	7	9	4		6		
Meador at James	am			3	3	2	3	3	3	3		32	49	52	50	50	48	53			22	20	28	34	28	32		
Meador at James	pm			3	3	3	2	2	3	3		77	68	87	43	85	87	76			72	32	66	42	69	55		
Lakeway at Lincoln	am			3	3	2	2	3	3	3		26	35	36	28	35	35	26			31	42	51	78	39	49		
Lakeway at Lincoln	pm			3	3	3	3	3	3	3		79	72	54	50	43	44	61			129	142	124	139	111	99		

# Morning/Afternoon Comparison



# Gender Data



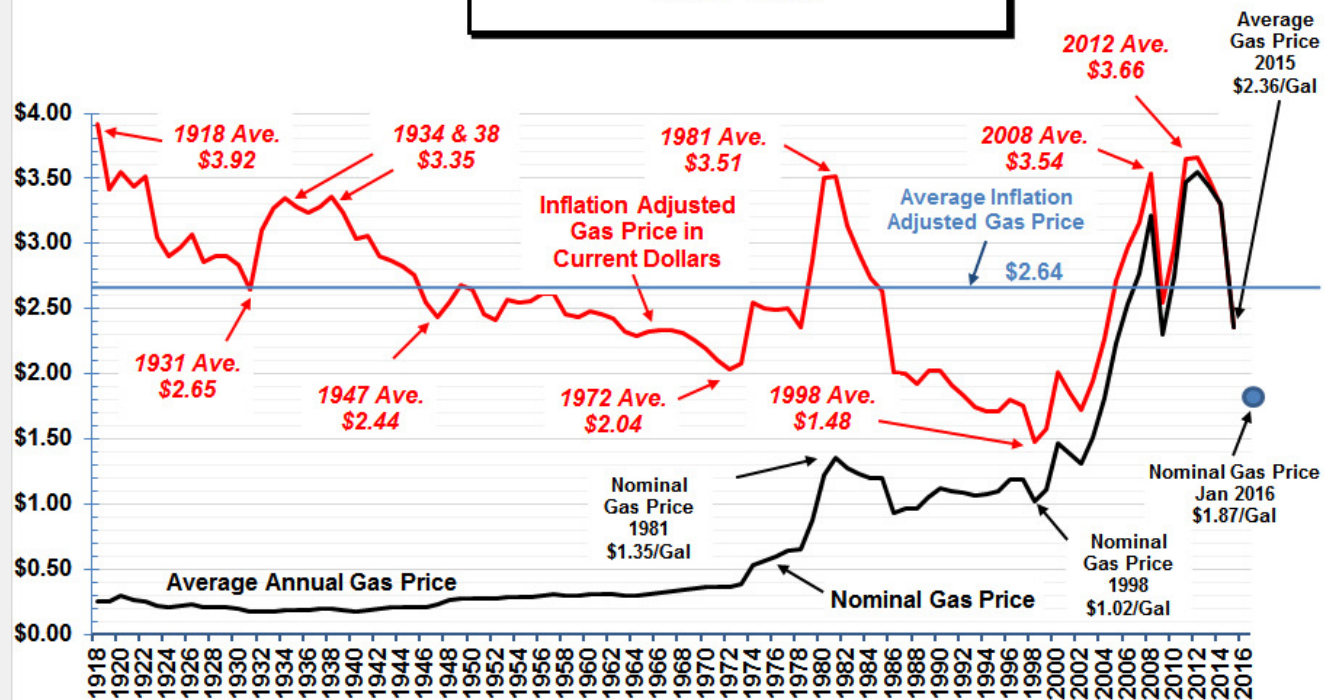
# Annual Average Gasoline Prices

1918 - Current

Adjusted for December 2015 Inflation

© 2016 InflationData.com

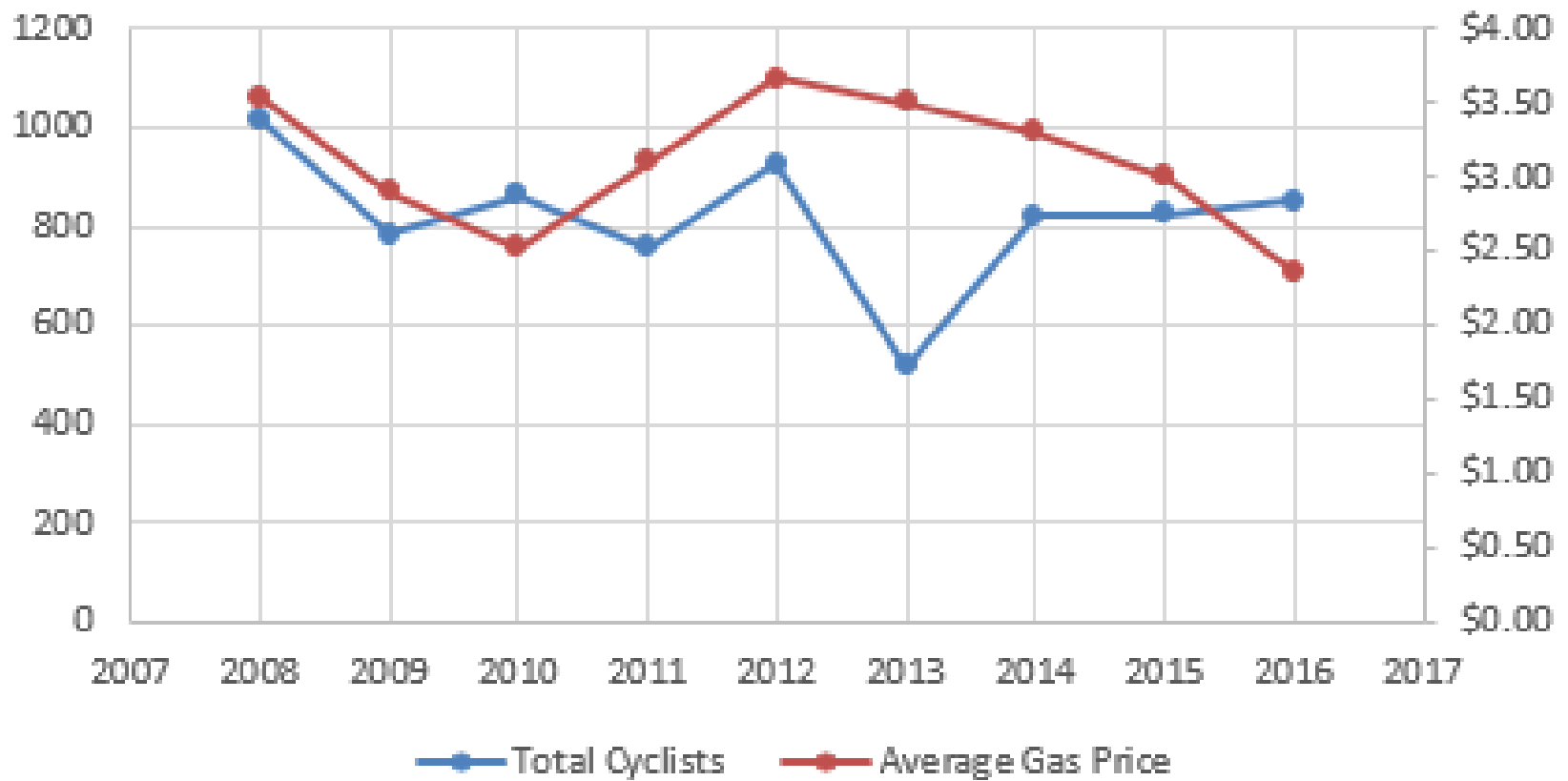
Updated 1/20/2016



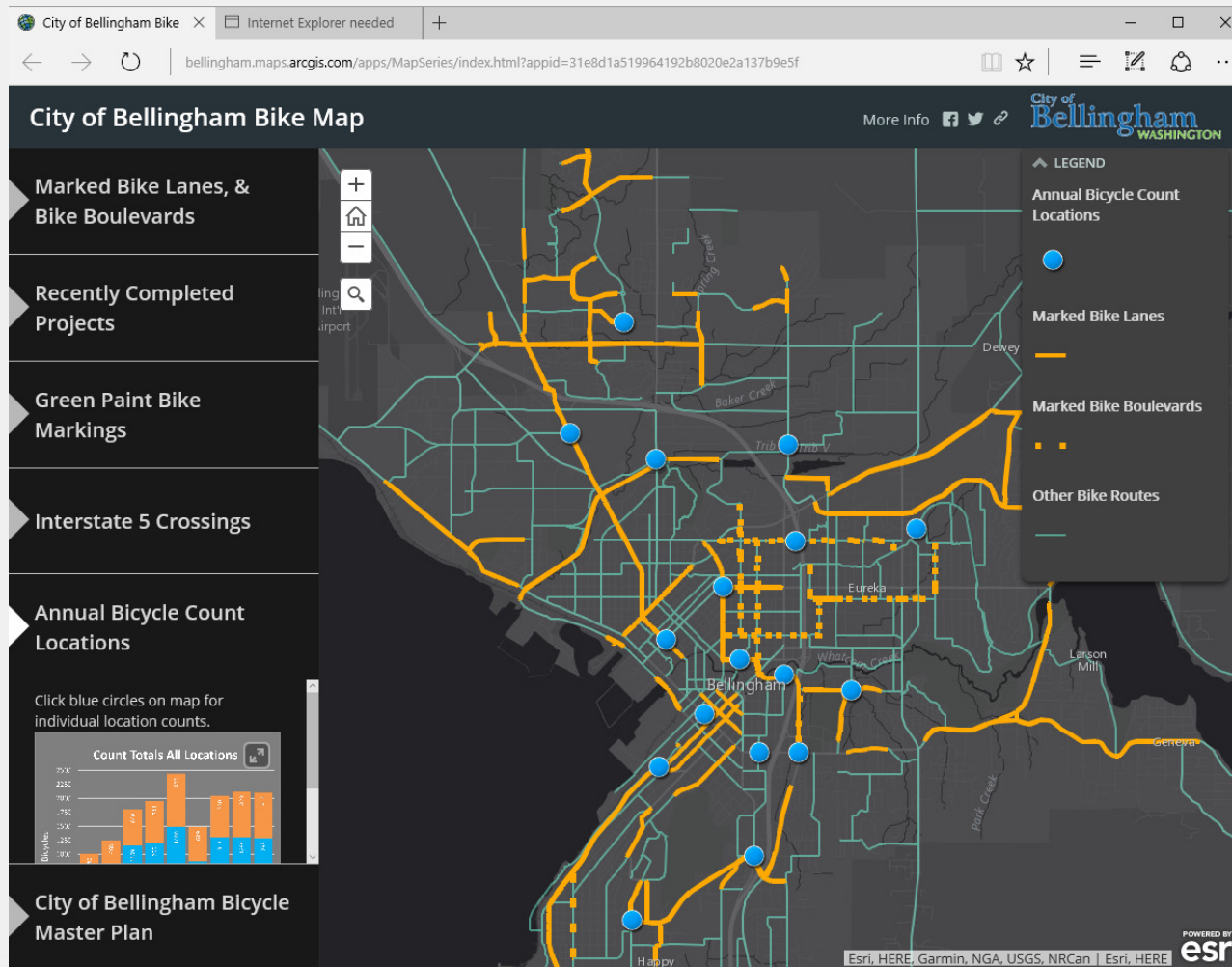
Note: Prices are Average Annual prices for Retail Regular Gas not Peak Prices so peaks are smoothed out.

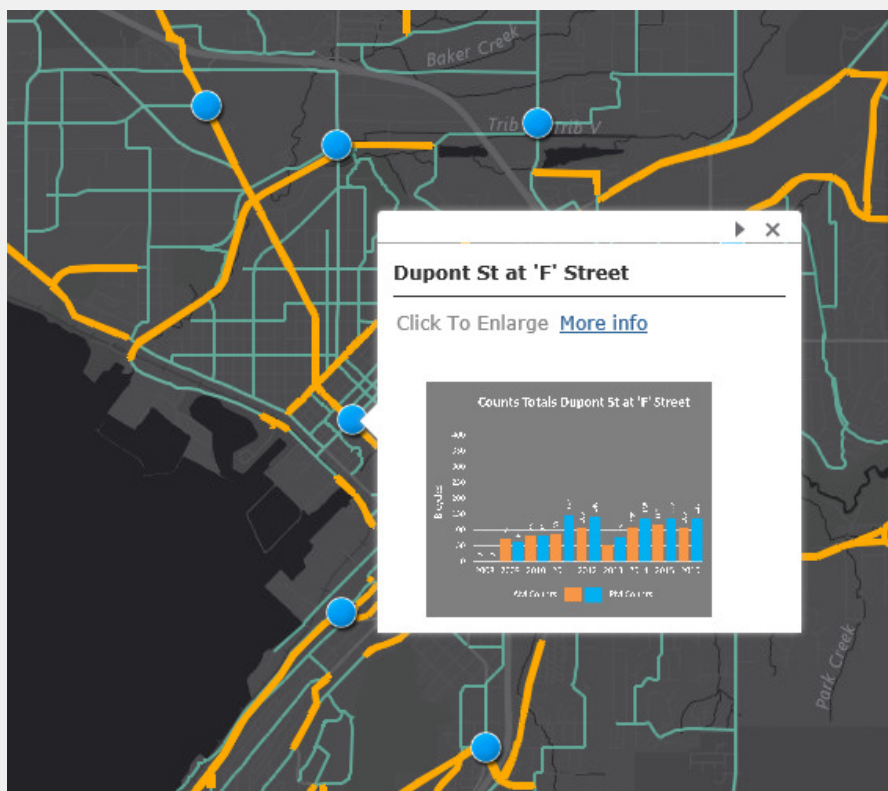
Source of Data: US Energy Information Administration  
CPI-U Inflation index- [www.bls.gov](http://www.bls.gov)

### Count Numbers/Average Gas Price

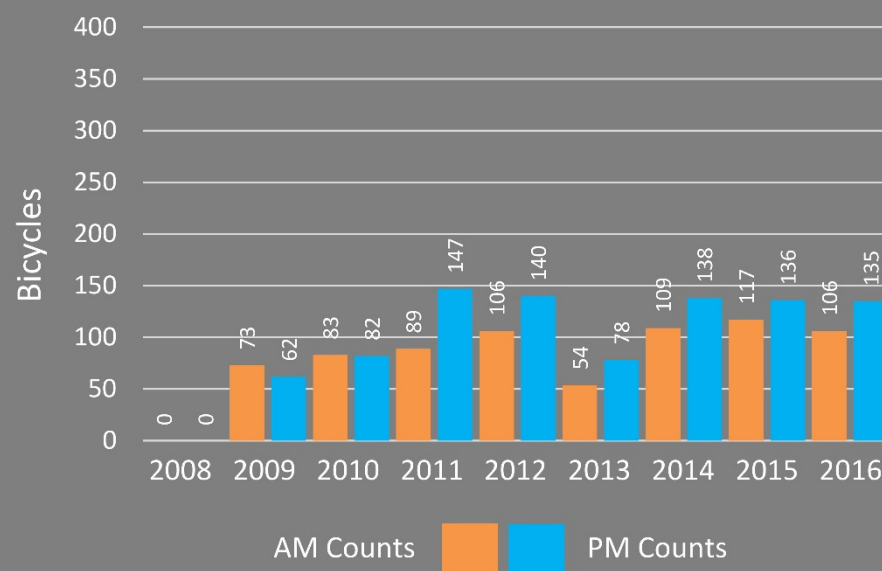


# Bike Count Locations





## Counts Totals Dupont St at 'F' Street



# Added Benefits (beyond the numbers)

- Observe behaviors:
  - Wrong way/sidewalk riding
  - Actual routes vs assumed
  - Rider demographics
- Validate permanent count data
- Community Input
- Create Awareness



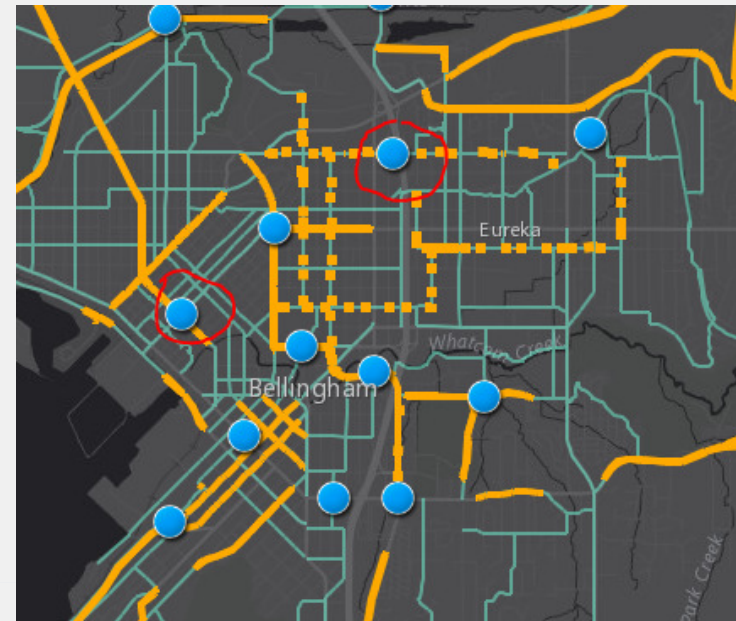
# Tips for Volunteer Longevity

- Make it easy
- Personal contact
- Share data/stories



# Next Steps

- Expand Short Term Counts
- Permanent Counters





# Questions?

Thank you!

Kim Brown  
ADA/Transportation Options Coordinator  
City of Bellingham  
[kimbrown@cob.org](mailto:kimbrown@cob.org)  
(360) 778-7950



City of  
**Bellingham** Public Works

# SRTC Proposed Bicycle and Pedestrian Count Program

Update on Washington's Bike and Walk Data Network: How  
Permanent Counters & Annual Counts Work Together

June 22, 2017



# Purpose

- ▶ Performance monitoring
  - Comply with FAST ACT Performance Management requirements
  - Commute-to-work does not represent all bike and walk trips
  - Stakeholder feedback: find more representative bike/ped data source
- ▶ Create systematic process to monitor use/performance over time
- ▶ Make jurisdictions more competitive when applying for funding



# Reason to Conduct Counts

- ▶ Performance reports/trends
- ▶ Necessity for obtaining funding
- ▶ Safety analyses
- ▶ Project prioritization
- ▶ Project justification
- ▶ Facility Design



# Components of Count Program

- ▶ Permanent Count Program
- ▶ Short Duration Count Program



# Count Types

## ▶ Permanent Counts

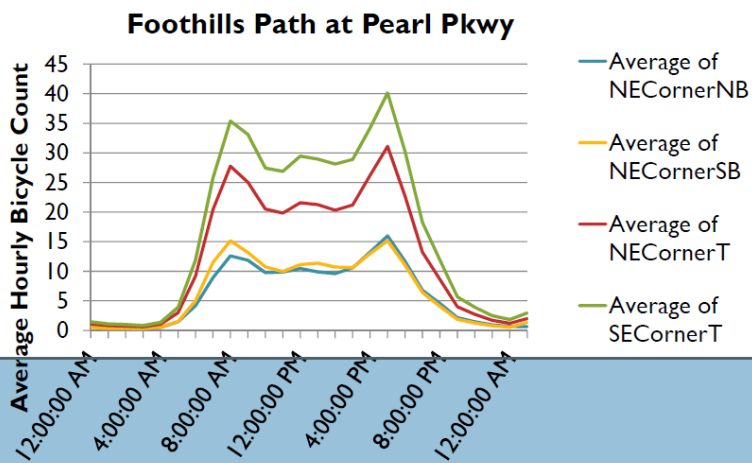
- 24-hour, year round data collection
- Used to establish *factors* to translate short duration counts into Average Annual daily bike/walk trips (AADB or AADP)

## ▶ Short Duration Counts

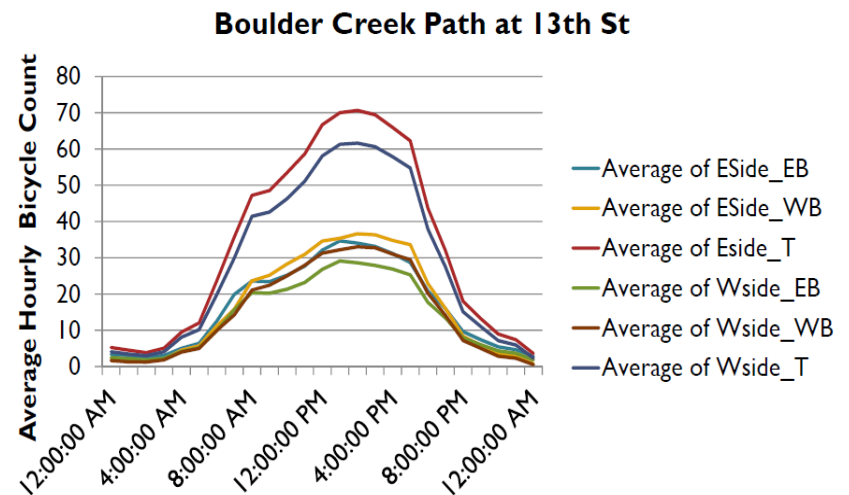
- Count one hour to one week (optimal)
- Can be factored up to AADB or AADP

# Factor Groups

## Commute Pattern



## Recreation Pattern



# Factor Calculation

- ▶ Develop Factors for Annualizing:
  - Hour of Day
  - Day of Week
  - Month of Year

- **Adapted from Traffic Monitoring Guide (TMG)**

$$AADB \text{ or } AADP = C_{known} * H * D * M$$

$C_{known}$  = known manual count for one hour

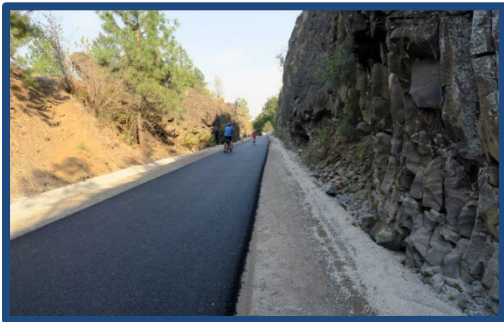
$H$  = Hourly Factor

$D$  = Daily Factor

$M$  = Monthly Factor

# Steps to Establish Factor Groups

- ▶ Develop Inventory of continuous count sites
- ▶ Determine Factor Groups through counts (or logic then verified by counts)
- ▶ Develop at least 3 permanent counters per factor group:
  - Urban Commute
  - Urban Recreational
  - Urban Mixed
  - Rural Commute
  - Rural Recreational
  - Rural Mixed



# Estimated Budget

- ▶ >2-3 permanent counters within Factor Groups:
  - Urban Commute
  - Urban Recreational
  - Urban Mixed (both commute and rec)
  - Rural Commute
  - Rural Recreational
  - Rural Mixed
- ▶ Estimated Budget – up to 24 permanent counters:
  - \$108,000 (+ 100 hrs labor)



# Questions?

Thank you!

Amanda Mansfield  
Associate Transportation Planner  
Spokane Regional Transportation Council (SRTC)  
[amansfield@srtc.org](mailto:amansfield@srtc.org)  
(509) 343-6384

